PERFORMANCE DIFFERENTIALS OF AGGLOMERATION AND STRATEGIC GROUPS: A TEST OF INCUBATION AND NEW VENTURE STRATEGY

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ABSTRACT

Our paper investigates how nascent firms 'performance is affected by strategic group membership and industrial agglomeration. Agglomeration is defined using geographical concentration while strategic groups are measured as incubated firms that belong to the industry most highly represented within an incubator. Results reveal that incubated firms in counties with higher levels of agglomeration experience a lower hazard of exit. Similarly, incubated firms that belong to a strategic group have a lower hazard of exit. However, the combined effects of agglomeration and strategic group membership based on a three-way interaction between incubation, agglomeration, and strategic group membership leads to an increased hazard of exit.

INTRODUCTION

Entrepreneurship scholars have long debated how environmental contingencies affect the performance of new firms (Davidsson & Wiklund, 2001; Wiklund & Shepherd, 2005). While strategy (McCann & Folta, 2008) and economics (Ellison, Glaeser, & Kerr, 2010) scholars often pursue this line of research this line of research to study established firms, we know less about how these mechanisms might impact the performance of new firms. Management literature offers two main views: some argue that competitiveness emerges mostly from the unique set of resources and capabilities within a given firm (Barney, 1991, 2001), in what has been called the resource-based view of the firm. Others defend that industry and environmental factors are equally relevant to understanding the sources of competitive advantage of new firms (Davidsson & Wiklund, 2001; Wiklund & Shepherd, 2005). This second perspective is based mainly on Michael Porter's work (Porter, 1980, 1996) and regards the need for strategic planning as a response to external market forces.

The emergence of the strategic group literature offers an intermediate level of analysis emerged between macro and micro perspectives of firm performance. Strategic groups are sets of firms within the same industry following similar patterns of decision making and competitive strategy (Porter, 1979, p. 215). Group membership implies similar firm behavior and mutual dependence (Caves & Porter, 1977). The concept of strategic groups emerged tied to the concept of mobility barriers: entry barriers applied to a group of companies rather than to a single firm (McGee & Thomas, 1986). Since strategic groups share structural similarities, firms wishing to shift their strategic positioning will be deterred by group-specific mobility barriers. Together with entry barriers, these provide a dual protection to individual firms (Porter, 1979, p. 216). The effect is that that competition within group is more intense than across strategic groups and indeed this effect has been shown empirically (McNamara, Deephouse, & Luce, 2003).

Similarly, industrial economists argue that geographical location plays a role in determining firm performance due to agglomeration effects (McCann & Folta, 2008). The popularity of

Porter's work on the competitiveness of nations (1990) triggered interest from policy makers and academics alike on the effects of agglomeration of firms on regional economic prosperity. More interesting for management scholars, the view that similar firms choose to concentrate in a location raises concerns about competitiveness, productivity and performance (McCann & Folta, 2008).

This paper combines these views and investigates how industrial agglomeration and strategic group membership affects the performance of new ventures. We argue that these notions are complementary and their superposition is essential to understanding the effects of industry and the environment on nascent firms' performance.

We base our empirical analysis on a matched panel dataset of 46,772 incubated and non-incubated new ventures. Among these 18,426 are incubated firms. We investigate whether the interaction between incubation and measures of agglomeration and strategic group membership lower exit rates. We contribute to the strategy literature by narrowing our analysis to industrial competitive strategies at the local regional level among new ventures. These findings provide a fresh perspective on founding strategies of new ventures that offer practical implications for entrepreneurs seeking to reduce the exit rate of their new ventures and policymakers seeking to increase entrepreneurial rates regionally.

THEORETICAL BACKGROUND AND HYPOTHESES

Strategic Groups

Strategic groups are an intermediate configuration between the firm and industry levels (Short, Payne, & Ketchen, 2008). This body of literature has often sought to understand competitive behavior and its sources. The rationale for classifications like strategic groups is to minimize economic asymmetry across groups of firms in an industry, such as those that share a similar product range (McGee & Thomas, 1986, p. 142). In more theoretical refinements of the concept, Porter introduced the notion of a common strategy as the defining feature of firms belonging to a strategic group (Porter, 1979). These groups emerge as a consequence of mobility barriers, which work as entry barriers on the strategic group level, and provide an advantage to firms within the strategic group over others (McGee & Thomas, 1986).

Most empirical literature identifies strategic groups as subgroups of industry using industry classification coding such the North-America SIC. McGahan and Porter (1997) use 4-digit SIC codes and find that there are performance differentials across strategic groups but only for certain industrial sectors which include entertainment and services. Others have used similar methods to compare the impact of firm-, strategic group- and industry-level effects on performance (Short, Ketchen Jr, Palmer, & Hult, 2007). Results show that firm-level effects are the strongest while strategic group-level effects outweigh the industry-level effects in some industries. Drawing on Porac and colleagues' notion of cognitive communities formed by competitive groups (Porac, Thomas, & Baden-Fuller, 1989), it has been shown that performance differentials are more significant within strategic groups than across strategic groups (McNamara, et al., 2003).

All these grouping variables illustrate the supply side facet of strategic group research thus far. Rather than grouping firms that share similar *strategies*, research has mostly focused on firms' *behavior* or *performance*. Few studies have in fact identified strategies as means to delineate a strategic group (e.g. Kline and Smith, 1995). Further, empirical work largely ignores any spatial

effects of strategic groups. If firms within strategic groups are to be mutually dependent and responsive to the groups' behavior, then geographical distance between group members should be accounted.

Agglomeration effects

The origins of agglomeration effects stems back to Alfred Weber's Über den Standort der Industrie (Theory of the Location of Industries) in 1909. According to Weber, industries agglomerate in order to minimize transportation and labor costs. These are minimized if there is enough demand for support services for the firm and labor force, if there is cheap or readily accessible labor, or if a firm's customer base is agglomerated. Earlier still, Cummings (1890) talks of agglomeration during the French Revolution of hundreds of "tailors, masters and men, who saw in associated employment the possibility of securing the government contract for making the uniforms of the National Guards." In Principles of Economics, Marshall (1890) talks about agglomeration benefits arising from cities, how they allow for labor market pooling, input sharing, and technological spillovers (Rosenthal & Strange, 2003). These early conceptualizations of agglomeration laid way for most of future research in the field.

Until the 1990s, agglomeration research was primarily the domain of economics and policy-oriented research. Michael Porter's work on the competitiveness of nations (1990) sparked public interest in the notion of industrial clusters and sources of location based competitive advantages. Appold's (1995) evaluation of Bain's (1951) Structure-Conduct-Performance paradigm inspired management scholars to look closely at the interactions between agglomeration, industrial clusters, and competitive advantages. By assessing the metalworking section, he showcased how the number of producers in a market (structure) affects price and production levels (conduct) which resulting in favorable or unfavorable ratios of cost to price and profit (performance). Similarly, in their study of the Manhattan hotel industry, Baum and Mezias (Baum & Mezias, 1992) utilize Ellinger's (1977) definition of agglomeration economies and identify it as arising from shared infrastructure and lower informational and consumer search costs. Further, Ellison and Glaeser (1997) distinguished between two types of agglomerative forces- spillovers, consisting of physical and intellectual spillovers and natural advantages, in the absence of which a group of firms would choose to agglomerate in a completely random fashion.

After a century of agglomeration research in economics and management, certain themes have emerged. First, firms may decide to agglomerate due to advantages that are specific to the location, independent of the firms that locate in a region (natural advantages) and/or due to spillover-like advantages that are derived from collocating with other firms. Second, the types of advantages that firms gain can broadly be thought of as advantages in production and/or advantages of market demand. Finally, much like economies of scale within a firm, agglomeration within industries can lead to both positive and negative externalities, wherein cooperative tendencies are pitted against competitive pressures.

Despite the clear advantages of industrial agglomeration for regional economic prosperity, management scholars rightly point out the challenges of such firm concentrations (McCann & Folta, 2008). Firms choosing to collocate will enjoy some agglomeration effects but should simultaneously expect to be more exposed to competitors. This raises important concerns about the effects of agglomeration in productivity, performance, and competitiveness of firms and the cluster.

Agglomerated entrepreneurial strategic groups

Currently, studies on the effects of agglomeration and strategic groups have ignored the entrepreneurial process. While some authors recognize the importance of the environment and industry on the performance of nascent firms (Davidsson & Wiklund, 2001; Wiklund & Shepherd, 2005), most work still fails to integrate these perspectives.

We define agglomerated entrepreneurial strategic groups (AESG) as groups of nascent firms following similar strategies and sharing the same physical location. While our definition of AESG may resemble the definition of industrial clusters, we argue that AESGs are a distinct phenomenon in that firms belonging to an AESG share not only industry and geographical similarities but also entrepreneurial strategies. Entrepreneurial strategies differ from other strategies and consist of

> "…the creation or re-creation of the fundamental set of relationships characterizing a organization's behavior: its environmental, internal and input-output parameters" (Murray, 1984, p. 3).

Entrepreneurial strategies can be enacted as a response to environmental changes and can be followed in greater or lesser extent by any firm regardless of its innovativeness (Murray, 1984). However, for purposes of defining an AESG, we only consider nascent firms since those will forcibly follow similar strategies.

Nascent firms experience a lack of internal capabilities to cope with fast changing environments. Typically, all new firms go through a process of learning by doing until they finally create and establish the necessary routines and capabilities that will in the future define their operation (Levitt & March, 1988). It follows that nascent firms will experience similar difficulties and therefore follow the same strategies with the aim of establishing the necessary internal routines to thrive.

AGGLOMERATION, ENTREPRENEURIAL STRATEGIC GROUPS AND FIRM PERFORMANCE

In recent years, the idea of an entrepreneurial ecosystem has been gaining ground (Isenberg, 2010). These ecosystems consist of supporting environments where nascent firms can more easily thrive surrounded by the experiences of other start-ups, established companies, as well as universities and regional governments. The main assumption of creating such ecosystems is that firms locating within this supportive environment will enjoy more support and therefore increase their chances of survival while experiencing higher levels of performance.

Business incubators are one example of entrepreneurial micro-ecosystem. A business incubator is an organization that supports the creation and growth of new businesses by providing subsidized office space, shared administrative services, access to capital and financing, networking opportunities, and assistance with legal, technology transfer, and export procedures (Allen & Weinberg, 1988; Erlewine & Gerl, 2004; Hackett & Dilts, 2004). In addition, local governments and policymakers support business incubation because they assume incubators can generate employment, innovation, and growth by helping new businesses avoid liabilities of newness (Erlewine & Gerl, 2004; Stinchcombe, 1965). Incubated firms are essentially members of strategic group since they follow similar entrepreneurial strategies by accessing the resources, knowledge,

and networks of incubators. Additionally, when incubated firms enter into incubators specializing in a particular industry, they form a micro-agglomeration.

Effects of agglomeration

Several studies have examined the effects of industrial agglomeration on firm performance. These studies have shown that agglomeration leads to better firm performance, beyond what could be accounted by firm capabilities or industry characteristics. In their study of the Manhattan hotel industry, Baum and Haveman (1997) show agglomeration benefited hotels of similar price more than the costs associated with localized price competition. In a similar study of the Texas lodging industry, Chung and Kalnins (2001) observe that chain hotels and larger hotels create positive externalities for their independent and smaller counterparts. Thus, agglomeration serves to increase overall market demand to the extent that the independent and small hotels enjoy agglomeration gains, which are over and above competition-losses.

Studies have also shown that agglomeration has implication for firm innovativeness. For instance, Audretsch and Dohse (2007) conclude that agglomeration makes knowledge resources more accessible to firms and result in higher rates of growth for firms, especially for young, technology-oriented firms. Fischer and Harrington, (1996) show that agglomeration leads to greater product heterogeneity. Harrison, Kelley and Kent (1996) separate out the effects of urbanization and localization on the innovative behavior of individual companies and show that both have significant influence on firm innovation. Bell (2005) distinguishes between the effects of networks and geographic clusters on firm performance and shows that industry clusters have a distinct positive impact on firm innovativeness. Squicciarini (2009) provides a before-and-after analysis of the impact of firm-location within a cluster conducive to knowledge spillovers. She finds that the patenting activities of firms are enhanced when they locate within science parks.

Prior studies have also examined the effect of agglomeration on new firm survival and performance. Baptista and Swann (1999) show that firms grow faster in their own-sector clusters. This is seen to hold true across differently composed samples of computer industries in the US and UK. Survival rates for new firms are higher in own-industry clusters, by reducing liabilities of smallness in the initial periods of the firm's existence (Pe’er and Vertinsky, 2006). In a study of new firms entering the Greek manufacturing industry, Fotopoulos and Louri (2000) conclude that spatial concentration leads to higher chances of survival, especially for smaller firms. Wennberg and Lindqvist (2009) examine Swedish firms across several industries (telecom and consumer electronics, financial services, information technology, medical equipment, and pharmaceuticals) and report that clusters within the same and related industries lead to higher survival rates, employment, tax payments, and salary payments for new firms. Thus, we conclude that:

H1: Higher levels of industrial agglomeration increases new firm performance among incubated firms.

Entrepreneurial strategic group performance

The literature on performance, competition, and strategic groups tends to ignore its implications on the competitive strategies of new ventures with the exception of Short et al. (2008) who suggest that opportunities exist to examine the links between organizational configurations and new firm performance. The strategic group literature is rich with research questions seeking to explain how interorganizational relations and competition affect strategy and performance.

Beginning with the commonly accepted notion of strategic groups as firms within the same industry making similar decisions (Reger & Huff, 1993), we extend this research domain into the phenomenon and behavior of entrepreneurial firms.

The conceptualization of a strategic group varies accordingly to whether empirical focus is on a commonly shared group strategy or the relative importance of the group to performance. For example, Cool and Dierickx (1993) studied strategic groups to understand whether a firm's profitability altered in respect to its rivals depending on its relevant strategic space. Others approach the topic by conceiving distinct strategic groups and examining which clusters of firms achieve superior competitive advantages (Fiegenbaum & Thomas, 1990). From a cognitive perspective, scholars argue that strategic groups affect the way firms view themselves and their competitors within the industry and thereby their strategic actions (Reger & Huff, 1993). Thus, by referencing themselves to competitors and peers, firms find ways to understand the complex industries in which they operate, thereby modifying their decision-making processes and strategic behavior (Fiegenbaum & Thomas, 1995). Given the varied approaches to observing strategic groups, Dranove, Peteraf, and Shanley (1997) argue that group level effects can only come about through group level processes and interactions and cannot be evaluated without separately accounting for firm and industry level effects. Similarly, Osborne, Stubbart and Ramaprasad (2001) suggest that stable strategic groups evolve through a recursive process of competitive enactment involving mental models and performance.

The interest in strategic groups stems from the possible implications of discovering whether certain organizational configurations led to improved performance. By belonging to a strategic group, firms can erect mobility barriers, which dissuade entry by other rival firms (Porter, 1976, 1979). While some scholars have looked at the performance effects of strategic groups in comparison to firm or industry effects, others focus on whether membership itself leads to better performance. The work of Short et al. (2007) represent an example of the former interest in a study that concludes that significant strategic group affects on performance exist but that the effects on performance depend on the performance measure. An example of the later includes the work of McNamara, Deephouse and Luce (2003) who suggest that strategic group membership allows firms to take up viable strategic positions. They also allow firms to anticipate other firms' future strategies (Fiegenbaum & Thomas, 1995) and thus sustain competitive advantages. Still others have distinguished between how group membership affects the firm's performance within and across strategic groups and shown that strategic group membership can intensify rivalry among members (DeSarbo & Grewal, 2008). Nonetheless, by belonging to a group, firms can have advantages in market power, efficiency or profitability (Dranove, Peteraf and Shanley, 1997). Thus, there is reasonable precedence in the strategic group literature to suggest that strategic group membership leads to higher performance. Hence, we conclude that strategic group membership increases new firm performance.

H2: Entrepreneurial strategic group membership increases new firm performance

Agglomerated Entrepreneurial Strategic Groups

The pursuit of business incubation in order to reduce a firm's liabilities of newness and tap into an incubator's network of experienced business leaders and management consultants for mentorship characterizes our definition of an entrepreneurial strategy (Murray, 1984, p. 3.) A new venture's entry into an incubator and its pursuit of strategies set forth by the incubator represent a strategic set of decisions whereby the new firm gains access to certain economic advantages

(Chandra, Chao & Ryans, 2011) and establishes social relationships (Adlesic & Slavec, 2012) with competitor firms and other relevant firms. Thus, within the incubator a fundamental creation and re-creation of economic and social relationships takes place. By aligning their input-output parameters with specific conditions limited by their external environment (here, the incubator), new firms adopt a set of input-output processes that can potentially reduce environmental uncertainty and enhance the use of their limited resources. For instance, Bruneel, Ratinho, Clarysse & Groen (2011) suggest that unlike new firms that develop routines and capabilities through experiential learning, incubated firms can avoid the trial and error process, progress along the learning curve more quickly and lower their probability of failure. Moreover, the pursuit of incubation signals to the market that the new firm is being proactive in gaining control of the knowledge, expertise and economic resources necessary to compete against established competitors and other firms in its industry.

Thus, we propose that the combination of both effects - agglomeration and strategic group membership - also increases new firm performance. This is because together, these two effects augment the entry barriers erected against rival firms and therefore, the protection provided to the nascent firms. Nascent firms that do not belong to a strategic group would suffer from even greater liabilities of newness due to their inability to understand the industries or environment in which they operate and to cope with uncertainty (Fiegenbaum & Thomas, 1995); indeed a new firm must have some sense of its boundaries and relationship with the environment before successfully completing the initial phase of development. Without this firms would have to constantly reinvent their strategies, which is difficult given the resource constraints that new firms often face. Similarly, geographic concentration allows nascent firms to enjoy positive externalities emerging from the cluster (Audretsch & Dohse, 2007, Bruneel et al., 2011), thereby creating an additional barrier; firms seeking relocation would lose contact with its environment and lose access to the benefits of cluster membership. We therefore offer the following hypothesis:*H3: Higher industrial agglomeration combined with strategic group membership increases new firm performance.*

DATA AND METHODS

Data

To test our hypotheses, we utilize a quasi-experimental design to decipher differences in exit rates of among incubated and non-incubated firms controlling for agglomeration effects at the level of the county and strategic group membership at level of the business incubator. Thus, we assembled and merged three datasets: a population panel of business incubators operating in the U.S. between 1955 and 2008, a panel of incubated and non-incubated firm level data from the National Establishment Time-Series (NETS) database provided by Walls & Associates (Walls, 2009), and a panel of agglomeration variables downloaded from the U.S. Census's County Business Patterns dataset. The datasets are structured in an event history format, where each record corresponds to a single organization-year spell.

Unlike previous research on incubated ventures that has relied on small, non-random samples often conducted by incubator sponsors (Macadam, Galbraith, Macadam, & Humphreys, 2006), this dataset represents the population of business incubators that have existed since 1955 and their associated business tenants beginning in 1992.

Business incubator panels. We created the most inclusive and exhaustive census of business incubators possible by collecting membership rosters of the National Business Incubation Association, 23 state associations of business incubators, and economic development resource lists from 50 state governments. Because the majority of business incubators incorporate as nonprofit organizations, we searched for missing incubators through the National Center for Charitable Statistics (NCCS), a clearinghouse of data on the nonprofit sector. Additionally, Walls & Associates conducted a final search for missing incubators using the NETS database. In total, we identified a population consisting of 833 business incubators with operations in approximately 1,000 unique addresses.

Incubated ventures panel. To overcome the difficulty of collecting accurate accounts of surviving and exited incubated firms (Hackett & Dilts, 2004a), we extracted a sample that represents the majority of the population of all incubated ventures from the NETS database. The NETS database holds annual observations for over 36.5 million business establishments and is built from annual snapshots of Dun & Bradstreet (D&B) data (Walls, 2009). This database provides annual geographic, descriptive, and performance data, such as every known address for an organization, the year in which a business moved into or out of a particular address, industry codes, and founding and termination years (Walls, 2009).

Because the NETS defines business establishments as a "business or industrial unit at a single physical location that produces or distributes goods or performs services" (Neumark, Zhang, & Wall, 2005), we conducted an address-based query to extract a population of incubated organizations using the known addresses of business incubators. This generated a panel of approximately 23,500 likely incubated ventures. However, the dataset of incubated ventures pulled from the NETS also contained several businesses that were not incubated because many incubators are located in business parks and commercial centers where non-incubated organizations also reside. Thus, we carefully culled the panel so that it would represent the true population of incubated ventures contained in the NETS database.

In the past new venture data from D&B data has been criticized for ignoring unregistered nascent new ventures (Yang & Aldrich, 2012). This problem arose from practices by D&B prior to 1992, when data collection ignored yellow pages listings and relied exclusively on government records (Hmieleski & Baron, 2009; Neumark, Zhang, & Wall, 2006). Since then, D&B and NETS data at the establishment level has been found to be highly accurate when independently verified and their higher-level data such as industry and employment trends correlate highly with similar databases such as the Quarterly Census of Employment and Wages (Neumark, Zhang, & Wall, 2006). To mitigate these prior concerns, we limited our sample to observations after 1991.

Culling and validation of incubated ventures. Based on the definition of incubation and the entrepreneurship literature, we narrowed our population frame to ventures deemed to be young and small-medium enterprises at the time of founding. Thus, we narrowed down the NETS data by dropping organizations that were deemed large corporations with over 100 employees and older than 5 years when they moved into an incubator's address. Hence, we dropped 746 organizations, which were clearly large publicly traded corporations, 207 organizations with employment over 100, and approximately 3,400 businesses that were over 5 years when their associated business incubator was founded. These culling steps reduced the initial population of 23,500 potentially incubated organizations to approximately 19,000.

As a precaution, we also assessed the accuracy of the address matching process in identifying all former and current tenants of business incubators through a data audit. A random sample of 65 incubators and their incubated ventures (1,200 businesses) was pulled from the dataset. The 65 incubators were surveyed via e-mail, asking their managers to report which of the listed organizations were current or former tenants. The survey generated a 49% response rate, indicating that at least 80% of the businesses identified as incubated ventures were correctly identified as current or former incubator tenants.

Independent control group. We designed a valid matching method to generate a control group that would serve as our counterfactual for all hypotheses. Following the work of Rosenbaum (2002) and Hirano, Imbens and Ridder (2003) who demonstrate that selection bias can be attenuated with the use of propensity score matching when estimating the average treatment effect of an intervention, we created matched groups of incubated and non-incubated organizations. These are comparable across industry, geography, founding dates, and the gender and minority identity of the entrepreneur. Thus, by identifying a representative population of all incubated organizations and a matched group of non-incubated organizations we were able to conduct an analysis that could reliably estimate the effect of incubation on exit rates.

The design and extraction of a comparison group of non-incubated ventures required two steps. In the first stage, each incubated venture was matched to approximately seven non-incubated ventures based on founding year, county, 2-digit industry codes, and the gender and minority identity of the entrepreneur. Due to the high dimensionality of some of the observed covariates (i.e. founding year and county and industry codes) (Caliendo & Kopeinig, 2008), an exact one to one matching technique was ruled out because it would have resulted in many unmatched cases. Hence, 420 matching strata were created to represent the general founding years, county codes, industry, and entrepreneur's gender of the 19,103 incubated ventures. These 420 strata reflected seven general geography codes, five ranges of founding years, six industry groups, and two gender categories. For each incubated organization that fell into one of the 420 strata, seven randomly matched non-incubated organizations were pulled out of the NETS. This dataset represented the universe of non-incubated ventures contained within the NETS, which were similar to the incubated group in terms of geography, founding year, industry, and gender of the entrepreneur.

A second stage matching process allowed us to make the comparison group more equivalent to the incubated ventures by using a propensity score, which is defined as the probability of being incubated given observed covariates (Rosenbaum, 2002). The use of a propensity score to create a matched dataset helps overcome the problem of dimensionality among observed covariates that makes exact one to one matching difficult (Caliendo & Kopeinig, 2008). This matching method helps reduce bias in observational studies when random assignment to treatment is impossible. The validity of propensity score matching rests on the assumption that matching incubated and control cases with similar probabilities of being incubated allows for direct comparison of outcomes. In other words, if one can estimate a model for determining incubation using observed traits of incubated and non-incubated cases, then one can create valid comparison groups without randomization (Rosenbaum, 2002).

Thus in the second stage of matching, we calculated a propensity score for each incubated and non-incubated venture, taking into account 50 state dummy variables, 1,048 county dummy variables, founding years, nine industry dummy variables, and two dummy variables for the gender and racial identity of the entrepreneur. Based on the calculated propensity scores, each

incubated venture was matched to its three closest non-incubated ventures. In some cases, one independent control group firm serves as the counterfactual to two or more incubated firms.

In order to determine that incubated and non-incubated ventures shared similar likelihoods of incubation, we compared the density and distribution of their scores using a propensity score histogram. Based on the low levels of overlap for propensity scores higher than 0.5, we decided to drop those cases from the analysis.

Measures

Dependent variables. Our key dependent variable is organizational exit, which is a relevant measure of firm performance when firms are young (Geroski, 1995). In our study, the exit variable is equal to 1 if the last year of activity reported for a venture occurs on or before 2008, the last year of observation in our data.

Firm variables. The variable *founding size (log sales)* measures total sales of a firm in its first year of existence. We include this variable in our models because ventures that start larger may have survival advantages (Agarwal & Audretsch, 2001; Geroski, 1995). *Firm age* is a series of time-period variables that measure the age of a firm from founding in our exit models and it is a single variable that measures age in our growth models.

Incubation variables. To account for the heterogeneity among incubators, we control for whether an incubator is affiliated with an institution of higher education. Thus, *university incubator* is coded 1 if the incubator is sponsored and managed by a university or community college. Additionally, because the effectiveness of incubation programs may vary with experience, we control for *incubator age*. Finally, i*ncubation* is a dummy variable that equals one for ventures pursuing an entrepreneurial strategy or zero otherwise for the non-incubated comparison group.

Agglomeration variables. Agglomeration is a count of all the establishments in operation in a county at a given year. In order to ease interpretation of coefficients, we log transformed the agglomeration variable. *Agglomeration x Incubation* is an interaction term serving as our test of hypothesis 1.

Entrepreneurial strategic groups. Our observation of strategic group membership is based on Blau's index (also known as Herfindahl's index), which measures diversity among groups (Harrison & Klein, 2007). We calculated the Blau index for each incubator by year based on the two digit NAICS industry classification of incubated firms. The Blau index ranges from 0 to 1, where 0 indicates a high level of diversity and 1 indicates a high level of similarity. The mean and standard deviation of the Blau index for business incubators was .23 and .19 respectively. While the Blau index measures levels of industrial diversity within an incubator, it does not correctly specify whether an incubated firm actually belongs to a strategic group. Thus, we first identified all incubators with above average levels of tenant similarity (i.e. incubated tenants belonging to one or two industries). We then coded all incubated firms as belonging to a strategic group (*Strategic group member*=1) if they belonged to the industry most highly represented within that incubator.

Agglomeration x Incubation x Strategic group member is a three-way interaction term between our key hypothesized variables: *incubation*, *agglomeration*, and *strategic group member*. This variable serves our test of hypothesis 3.

Other controls. We include 86 dummy variables that control for industry effects at the 2-digit NAICS level. Miscellaneous and unclassified industries represent the excluded category in the models. To control for contemporaneous correlation with economic cycles, we included annual dummy variables from 1993 to 2006 that capture the economic cycles during economic expansions and contractions (Certo & Semadeni, 2006). If an observation falls within each of these time spans it is coded 1. Further to control for geographic differences in economic activities, we included cluster robust standard errors in our models that account for the 570 counties represented in our data.

Empirical Models and Analyses

Our interest lies in estimating the probability of organizational exit, due to incubation and the interaction between incubation, county level agglomeration, and strategic group membership. We chose to model organizational exit using an exponential model (Blossfeld & Rohwer, 2007).

FINDINGS

In Table 1, we present the exponential model regression results for the proportional hazard of exit for incubated and non-incubated ventures. Model 1.1 presents baseline results for comparison with Models 1.2-1.4, which test the hypotheses. The proportional effect of a given coefficient on the hazard of exit can be interpreted as $r(t) \equiv \exp(\beta t)$, where β is the estimated coefficient for a given time t. Therefore, as the coefficient increases, the exit rate increases. A negative coefficient for time-invariant variables can be interpreted as a reduction in the rate of exit, while a positive coefficient can be interpreted as an increase in the rate of exit. In cases where a measure varies with time, a unit decrease in the measure proportionally reduces the rate of exit for negative coefficients and a unit increase in the measure proportionally increases the rate of exit for negative coefficients. To interpret the effect of hypothesized variables, we anti-logged their estimated coefficients ($\exp[\beta t]$) to obtain an odds ratio.

Model 1.1 shows that the coefficient *incubation* is positive and indicates that ventures pursuing an incubation strategy have a hazard rate that is 20 times ([1-exp (.18)]; $p<.001$) higher than that of the comparison group. Thus, incubated new ventures tend to exit the market sooner than their non-incubated peers.

Model 1.2 reveals that higher levels of industrial agglomeration increases new firm performance among incubated firms. Thus, as agglomeration in a county increases there is a proportional decrease in the hazard rate of incubated firms that is .10 times ([1-exp (-.10)]; $p<.001$) lower than that of the control group. This supports hypothesis 1 and indicates that there are increasing returns to incubation as agglomeration increases in a county.

Model 1.3 reveals that membership in a strategic group among firms pursuing an incubation strategy decreases exit rates. These firms have a hazard rate that is .12 times ([1-exp (-.13)]; $p<.05$) lower than that of the control group. This supports hypothesis 2.

Model 1.4 reveals that higher industrial agglomeration combined with strategic group membership does not increase new firm performance. The three-way interaction between our incubation, agglomeration, and strategic group membership is positive. Thus, as agglomeration in a county increases there is a proportional increase in the hazard rate of incubated firms that belong to a strategic group that is .09 times ([1-exp (.09)]; $p<.001$) higher than that of the control group.

in a strategic group among firms pursuing an incubation strategy decreases exit rates. Thus, hypothesis 3 is rejected.

DISCUSSION AND IMPLICATIONS

This paper reveals that the choice of location and founding strategy of new ventures play an important role in the long term viability of a firm. Specifically, we find that there are increasing returns to locating a new venture in counties with higher levels of agglomeration. This suggests that counties with larger levels of firm populations tend to foster longer survival among new ventures. Due to the county cluster robust standard error method that we used in our analysis, we believe this finding should stand up to ever increasing use of county level controls such as per capita income. Additionally, the finding corroborates with recent research by Folta et al. (2006) who find that there are increasing returns to cluster size in the biotechnology industry. However, due to our broad measure of agglomeration, we encourage future scholars to find multiple intermediate measures of agglomeration that can account for the diversity of industry dynamics taking place in a region.

The finding that strategic group membership also helps new ventures remain in operation for longer periods offers another important implication. By improving on past measures of strategic groups, which typically rely on broad financial industry measures, we narrowed the scope of strategic choice by taking into account a shared founding strategy, industry and geographical location. Thus, entrepreneurs who chose to co-locate with firms sharing a similar founding strategy and industry can improve their chances of survival than those who do not. These results can be generalized to firms pursuing an incubation strategy across multiple regions, industries, and time periods.

Finally, our rejection of hypothesis 3 highlights an important discussion point. While we find that the combination of higher levels of agglomeration with strategic group membership increases hazard rates, we also note that Model 1.4 reveals a much stronger main effect in terms of strategic group membership. While Model 1.3 shows that hazard rates are reduced by .12 times for firms belonging to a strategic group, Model 1.4 shows that for the same group hazard rates are lowered by .63 times. Thus, accounting for agglomeration effects in the evaluation of strategic group effects significantly lowers the exit rates of incubated firms that form part of a strategic group. Note also that there is no change in the *agglomeration x incubation* interaction effect in Model 1.4. Hence, this implies that agglomeration results in diminishing returns to performance while leading to increasing returns in terms of strategic group performance. The finding suggests that entrepreneurs need to consider carefully not only their founding strategy but also the interplay between a founding strategy and localized agglomeration.

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REFERENCES

Allen, D. N., & Weinberg, M. L. (1988). State investment in business incubators. *Public Administration Quarterly, 12*(2), 196-215.

Audretsch, D. B., & Dohse, D. (2007). Location: A neglected determinant of firm growth. *Review of World Economics, 143*(1), 79-107.

Baum, J. A. C., & Mezias, S. J. (1992). Localized competition and organizational failure in the manhattan hotel industry, 1898-1990., 580-604.

Baum, J. A. C., & Haveman, H. A. (1997). Love thy neighbor? differentiation and agglomeration in the manhattan hotel industry, 1898-1990. *Administrative Science Quarterly, 42*(2), 304-308; 304.

Bell, G. G. (2005). Clusters, networks, and firm innovativeness. *Strategic Management Journal, 26*(3), 287-295.

Chung, W., & Kalnins, A. (2001). Agglomeration effects and performance: A test of the texas lodging industry. *Strategic Management Journal, 22*(10), 969-988.

Cummings, E. (1890). Co-operative production in france and england. *The Quarterly Journal of Economics, 4*(4), 357-386.

Davidsson, P., & Wiklund, J. (2001). Levels of analysis in entrepreneurship research: Current research practice and suggestions for the future. *Entrepreneurship: Theory and Practice, 25*(4), 81-100.

Ellison, G., Glaeser, E. L., & Kerr, W. R. (2010). What causes industry agglomeration? evidence from coagglomeration patterns. *American Economic Review, 100*(3), 1195-1213.

Erlewine, M., & Gerl, E. (2004). *A comprehensive guide to business incubation* (2nd ed.). Athens, OH: National Business Incubation Association.

Fotopoulos, G., & Louri, H. (2000). Location and survival of new entry. *Small Business Economics, 14*(4), 311-321.

Hackett, S. M., & Dilts, D. M. (2004). A systematic review of business incubation research. *Journal of Technology Transfer, 29*(1), 55-82.

Harrison, D. A., & Klein, K. J. (2007). What's the difference? diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review, 32*(4), 1199-1228. doi:10.5465/AMR.2007.26586096

Marshall, A. (1890). *Principles of economics: An introductory volume* (8th ed.). London: MacMillan & Co LTD.

McCann, B. T., & Folta, T. B. (2008). Location matters: Where we have been and where we might go in agglomeration research. *Journal of Management, 34*(3), 532-565.

McGahan, A. M., & Porter, M. E. (1997). How much does industry matter, really? *Strategic Management Journal, 18*, 15-30.

Rosenthal, S. S., & Strange, W. C. (2003). Geography, industrial organization, and agglomeration. *The Review of Economics and Statistics, 85*(2), 377-377-393.

Short, J. C., Payne, G. T., & Ketchen, D. J. (2008). Research on organizational configurations: Past accomplishments and future challenges. *Journal of Management, 34*(6), 1053-1053-1079. doi:10.1177/0149206308324324

Stinchcombe, A. L. (1965). Social structure and organizations. In J. G. March (Ed.), *Handbook of organizations* (pp. 142-193). Chicago: Rand McNally.

Weber, A. (1909). *Ueber den standort der industrien*

Wennberg, K., & Lindqvist, G. (2009). The effect of clusters on the survival and performance of new firms. *Small Business Economics*, , 1-21.

Wiklund, J., & Shepherd, D. (2005). Entrepreneurial orientation and small business performance: A configurational approach. *Journal of Business Venturing, 20*(1), 71-91.

TABLE 1

Comparisons of the Effects of Agglomeration & Strategic Group Membership on the Hazard of Exit

	Model 1.1		*Model 1.2*		*Model 1.3*		*Model 1.4*	
Initial sales(log)	1.02*	(0.01)	1.02***	(0.01)	1.02*	(0.01)	1.03***	(0.01)
Firm Age	0.95***	(0.00)	0.95***	(0.00)	0.95***	(0.00)	0.95***	(0.00)
University incubator	0.80***	(0.03)	0.83***	(0.04)	0.80***	(0.03)	0.83***	(0.04)
Incubator Age	0.99**	(0.00)	1.00	(0.00)	0.99**	(0.00)	1.00	(0.00)
Agglomeration	1.02*	(0.01)	1.07***	(0.01)	1.02*	(0.01)	1.06***	(0.01)
Incubation	1.20***	(0.04)	3.00***	(0.21)	1.21***	(0.05)	3.10***	(0.22)
Agglomeration x Incubation			0.90***	(0.01)			0.90***	(0.01)
Strategic group member					0.88*	(0.05)	0.37**	(0.13)
Agglomeration x Incubation x Strategic group member							1.09*	(0.04)
Constant	0.04***	(0.00)	0.03***	(0.00)	0.04***	(0.00)	0.03***	(0.00)
Parameters	106		107		107		109	
Log-likelihood	-44538		-44343		-44536		-44335	
Number of observations	210139		210139		210139		210139	
Number of organizations	46687		46687		46687		46687	
Number of incubators	570		570		570		570	
Number of exits	19834		19834		19834		19834	

NOTES: County cluster robust standard errors in parentheses.